Research essay "Can rich-habitat or cultural landscape management be ensured by private agents?"

In brief, one can state that it is a rare situation that a farmer can ensure agri-environmental goods at a social optimum in a free market at a maximum welfare, unless the farmer himself has high nonmonetary values.

One set of agricultural and forestry practices and standards including sparing an extra area for biodiversity or scenery are not optimal for an entire country. The key tradeoffs should be quantified locally.

The situation may be solved with the help of collaboration between private agents, society, and local governments, i.e., environmental community-based public-private partnerships.

At the same time, the key area of interaction is not the private agents, but rural areas as a complex of relations and core place for the agricultural and forestry activities, at participants´ and habitats´ level. The engagement and support of municipalities is an extremely important factor for the successful projects.

1. Agri-environmental goods market and market failures

The impacts of agriculture concern biodiversity, wildlife habitat, landscapes, animal welfare and human health through land management and use, producing agri-environmental public effects, which may be characterized both as positive and negative externalities.

There is a growing pressure on the agricultural and forest sectors both at the international policy level and from environmental organizations. The tone of the discussion is quite tensed, and there is more attention in media to the nature protection questions compared to the economic calculations on what agriculture and forestry bring to the national economies.

For example, one of the Finnish forest magazines Skogsbruket describes the forest areas in the Central Park of Helsinki as damaged due to overuse by residents not following the paths in the park. Official forest city planners encounter problematic and even aggressive attitude from some capital city dwellers opposing usual silvicultural measures needed for taking care of the city recreational forests (Björkqvist J., 2022). These processes happen in Finland, the most forested land in Europe.

Nowadays, society is willing to obtain more environmental services from the agricultural land and forests, especially in urban and intermediate regions.

In a market economy the present value maximization principle determines the land use. It is the activity that generates the greatest net present value (NPV) of future satisfaction to the owner. The same approach defines how that use is to be carried out. However, the greatest utility to the owner (**private optimum**) does not necessarily mean maximum benefit to the society due to the existence of market failures. The socially optimal model may differ due to unpriced positive and negative side effects.

A market economy could, in theory, maximize the social well-being under special set of conditions. Among them are the following very important in case of a market of goods and services connected to nature (Klemperer, 2003).

- Clearly defined property rights to resources.
- No free access to any scarce resource is allowed.
- Perfect competition between producers and buyers.
- Free entry of firms to the market.
- Perfect information, mobility of labor and capital.
- Priced products, services and resources.

If these conditions are not met, **market failures prevent the free market from reaching a welfare maximum.** Below there are some points in support of the fact that none of these criteria is working for the market of agri-environmental goods.

One of the examples of market failures is an open access to resources leading to the impossibility to maximize welfare. For example, for timber production in Finland the open access problem is virtually non-existent, since property boundaries are respected. But everyman's right allows anyone to use the same areas of nature for recreation. Open access is granted to such forest resources as scenic beauty, hiking, mushrooms, and berries gathering. The same regulation concerns many other countries. Users do not bear the costs of production or the cost to other users when the resource is depleted. It may be called underpriced public supply and also implies problems of free-riding.

A farmer producing agri-environmental public goods cannot exclude people from enjoying it and demand payment from them. Neither he can compensate them in case of producing public "bads", since not all the participants affected can be identified.

Besides it, the units of a landscape scenic beauty can't be sold; therefore, the farmers do not consider scenic damage that may occur from their agricultural practices like clear-cutting or even out of casual everyday activity. The same concerns the quality of water flowing. For unique recreational areas the following values exist but are not easily sold in the market – option value, existence value and bequest value. It can also be counted as a market failure which all in all makes it difficult to form a market for the environmental goods.

The main question regarding the provision of agri-environmental public goods is that farmers do not have the incentive to provide these goods. In general, a free market will not produce enough public goods, since private income or benefits obtained from that are insufficient or missing. To the extent that landowners do not receive all the benefits of landownership, they may discount or ignore the benefits collected by others.

2. Agri-environmental goods provided by a private farmer upon his own initiative.

First, we might consider a **case with a private forest optimal rotation period and nonmonetary values**. A long period with a standing mature forest provides both rich-habitats, biodiversity and scenic beauty.

When standing trees yield nonmonetary values like aesthetic benefits to farmers or recreationists, optimal rotations can be longer if compared to only economically based periods. If nonmonetary benefits are large enough, the rotation period can be even infinitely long, as in wilderness areas, or in case when, for example, an owner would like to save a part of a forest planted by his ancestors.

Recipients could be individual landowners or users of public lands. This value is then represented as a willingness to pay for the benefit (TWP) or a compensation required should it be lost (TWA). In this case utility is maximized choosing rotations far longer than if they are based on financial returns (depending on the owner's minimum acceptable rate of return).

This case can be compared to the situation, when a forest is owned by industry or an investors group who do not receive aesthetic benefits. In this case they may choose only financial period of rotation and have only their **private optimum**. **Social optimal rotation** may be longer, but the divergence between financial and social optimal rotation exists only if someone receives the nonmonetary benefit. If nobody has a benefit seeing the forest or using it, and the forest is used only for timber production, the financially optimal rotation is equal to the social optimum.

When agri-environmental goods have been traditionally free, though they could be priced, the consumers resist efforts to charge for them. However, if they were priced and the willingness to pay for them could be defined, private landowners would increase their efforts in producing these "positive side effects" of their forest or agricultural activity.

The next case is when a farmer decides to introduce an **activity aiming at protecting rich-habitat or developing cultural landscape, with the purpose to maximize benefits**. In this case measurement of environmental goods can be troublesome, and a payment mechanism is required. Private economic activity implies a market-like environment where people, acting individually, buy or sell private correlates of the public good to be valued. Payments should be based on actual participation in the market.

All private projects are usually ranked on the basis of financial criteria such as net present value (NPV), benefit-cost ratio (BCR), internal rate of return (IRR), and/or modified internal rate of return (MIRR), which should also be the case here.

Then in any situation the farmer outgoes from a multiple-use scheme on his land and should plan the activity based upon the combined calculations of profits and losses, trying to achieve multiple-use optima. The planning should also include the questions if the zones can have a mixture of activities or zones should be set for each activity separately. E.g., in many cases commercial activities preclude wilderness. It may be a mosaic of single uses on separate areas, or a dominant use with compatible side activities.

This implies equi-marginal principle for allocating **multiple-use budgets**. The most transparent economic planning is when the owner knows how to measure outputs in monetary values, distributional issues are solved, and it is clear who

receives which benefits and at what place. Then it is possible to compare the expenditures on wildlife management with the incomes.

The investment returns can be maximized by allocating the limited budget so that the rate of return on the last euro spent in each activity brings the same rate of return. It is also necessary to estimate whether the spending some of the core budget on a non-forestry or non-agricultural activity might bring even greater benefits. Costs connected to extra activities and producing several benefits may be planned as joint costs.

The total NPV addition from the non-agricultural/forestry activity equal to zero would mean that this investment is at a level of a minimum acceptance. The true net benefits from any added investment must be calculated in a multiple-use system. If the different plans show the same NPV levels for an owner, but are more beneficial to the society, the social welfare is more optimal.

One of the rare examples that is now in transition between the first case with nonmonetary values and sustainable environmental profit-making is a Finnish farm **Koski Manor** (Koskis Gård, http://koskis.fi), branded as Finland's most environmentally friendly farm. The description of its activity below shows that this type of efforts can bring benefits provided that the own territory is large and various enough, the grants and subsidies available, and a huge part of operations are aimed at individual consumers of agri-environmental goods.

Since the property is inherited, it is hard to assume that a deal to find such a territory and invest in it is physically and commercially viable nowadays. Unfortunately, the financial statement of the company is not open to public. The sources of information are the official website of Koski Manor and an interview with the estate owner at the portal Forest.fi.

Koski Manor owns one of the largest private forests in Finland - 1,700 ha, 100 ha of which are protected (the average private forest property is 30.5 ha).

The audit company Det Norske Veritas invited Koski Manor to become a pilot customer for the FSC certification in Finland. FSC certification has higher environmental standards and offer higher purchase prices for wood.

The protection sites on the estate are a part of the Forest Biodiversity Programme for Southern Finland – Metso, which enables private forest owners to protect and manage the natural values of their forests on a voluntary basis. The Metso program protects the most valuable, old and fertile forests on the estate. Otherwise, it would have been financially impossible to protect them, as the owner stated. Even protected forest has value as property and it also adds up value to hunting areas, for which the estate sells the hunting licenses. A special project aiming to improve the transition zone between open fields and forest makes it even more attractive to game animals.

The farm has been several times prized for its environmental responsibility - for example, in 2014 WWF chose it as the most environmentally friendly farm in Finland. Today, Koski Manor is a family farm in the sixth generation that produces organic meat and rural experiences. All the agricultural production is organically certified. The estate is engaged in carbon sequestration programs, holds the one of the two EU Wildlife Estate program ID in Finland, is a member

in several environmental organizations, e.g., the Living Baltic Sea Foundation (BSAG).

Direct subsidies from the EU funds helped to install a natural run-off water treatment system directed to an evaporative and nutrient-binding willow evaporation field; a network of 11 wetlands; protection zones along the rivers; 80 ha of natural pastures rehabilitated from the old ones; grazing based outside the field livestock farming.

Organic Hereford meat is sold from the farm's own online store. The farm also has farm tourism, such as a farm butcher shop, a summer café and conference facilities, and organizes various excursions for private groups. This type of activity helps to monetize the efforts despite the everyman´s rights access. For example, a 2-3 hours program of collecting berries and plants on the territory of the farm for max 12 people in 2021 cost 55 € per person (according to the everyman´s rights it is free for individual purpose for every person in Finland).

The prices for the local goods include the costs for conservation work, and the consumers can consciously make their purchasing choice for the welfare of the animals and the environment.

As a conclusion and in the absence of the financial reporting figures, the following phrase by Fredrik von Limburg Stirum, owner of Koski Manor, can still make us think if this type of farming is monetary profitable and the benefits are maximized: “I have the opportunity to have an influence on the environment on my own estate, but the estate operation must also be financially sound. I believe that in the long run, environmental goals and financial benefits can be combined better and better” (Forest.fi, 2019).

3. Damager liability or victim liability, freedom of individual landuse.

The private marginal cost function does not consider the negative externalities associated with agricultural activities. It is the social marginal cost that takes into account both the private costs of farming together with their social impacts.

Agricultural externalities occur upstream from the market for agricultural commodities, at a farm level where too many inputs are employed than socially desirable. The intensity of input, e.g., extensive use of fertilizers, pesticides, herbicides and land use, causes negative externalities. Another option of preserving the wildlife in the course of agricultural or forestry activity is in this case limiting the land use for agriculture.

The optimal damage framework (Klemperer, 2003) implies that there are some areas (certain wilderness areas) where even slight environmental damage should not be possible (the optimal damage level is zero). Whereas there are some areas where a temporary scenic damage, e.g., from logging, is possible due to little option demand or existence demand for scenic values (optimal damage level here is higher). It depends on how many people are affected, and a single optimal damage standard in this case is not applicable.

In theory, the optimum damage level is where the extra costs of moving from the optimum exceed the extra benefits. On both public and private land, it is

important to find the optimal side of negative side effects, such as damage to biodiversity, soil, wildlife and scenery, which can be done only locally. One set of forestry and agricultural practices can't be optimal for an entire country. The key local tradeoffs should be quantified.

Though states more or less successfully regulate environmental pollution levels for preventing agri-environmental damages, the conflicts between the landowners and the rest of society willing to consume the benefits of nature originate mostly, as it seems, out of collision whether it should be a "damager liability" or a "victim liability" to provide more of these agri-environmental goods, by shortening the intense use of inputs, including the land.

A **damager liability** principle allows no uncompensated environmental damage. Damagers are liable for damage reduction and must compensate the damaged parties. A **victim liability** presumes that damaged parties are liable for damage reduction and it is determined by how much they are willing to pay to reduce the damages (Klemperer, 2003).

Examples of a damager liability are social responsibility standards, voluntary certification, fines, public discussion and growing environmental requirements from the society, sometimes lacking economic grounds. In this case environmental lobbying could lead to greater provision of environmental amenities than socially optimal.

Victim liability is represented by discussions that in addition to the demand for food, willing citizens are expected to pay directly for some positive externalities – the visual amenities provided by the agricultural landscape (e.g., livestock grazing in a field, rapeseed in bloom), preservation of habitats and food for some species, etc. Even tax incentives or direct subsidies may reflect this principle.

In the situation of the growing demand for nature values, it may be socially optimal to incentivize farmers to increase production of environmental services. However, larger environmental gains are often distributed over so many people at low benefits per person that it is hard to organize and raise funds to support the policy. Losses are concentrated (e.g., limited use of resources) and gains are diffused.

For example, policies to change timber harvesting practices to protect plants and animals, improve climate and scenery may concentrate losses to small groups and diffuse gains regionally. If not regulated, the case may be vice versa, i.e. spread losses and concentrated gains.

The sensitive question here is **whether individual landuse freedom should be maximized or optimized**. The optimization point of view suggests that due to unpriced negative effects, optimal levels of individual freedom need to decrease in connection with the rising cost of a too high level of individual freedom, which means more costs to the society.

Governments could apply marginal analysis by gradually increasing actions to protect multiple-use values on private lands (damage fines, environmental standards, regulations, tax adjustments) as long as the resulting benefits exceed the added costs. These costs include also costs of losing freedom and administrative costs.

In most forested areas with low population the added benefits of limiting land use freedoms are less than in urban areas, so optimal level of rural intervention is theoretically lower than in practice. In areas where population increases, private landowners are subject to heavier government influence to protect multiple-use benefits. It is again the case, that it is not optimal to have the same approach over the country, whereas it is more beneficial to solve the situation locally.

From the other point of view, in a smoothly running competitive economy there might be many other ways to stimulate the landowners to provide wildlife values. Hunting licenses, ecotourism, agreements with environmental groups, carbon farming, etc., make government interfering non-optimal. Economic incentives literally induce environmental improvement by using economic benefit.

Land use freedom might be viewed in this context as a **choice to practice responsible management towards society's needs**. The government in this case should mostly develop best practices, self-regulating activities, and responsible land use of private owners.

4. Role of authorities in agri-environmental goods market functioning

The environmental policies are classified into direct regulation through legal structures, economic methods on well-developed markets and voluntary actions between society and private agents (Shimaoke, 2015). Technically, the government may apply a wide range of instruments to regulate provision of agri-environmental goods and provide unpriced goods: tax incentives, direct subsidies, fines, regulation of private forests and lands. It may even buy vulnerable areas and manage them.

However, in case when the damage is nonmonetary, e.g., for reduced scenic beauty, and is hard to be measured, the optimum damage level is difficult to define, since the social cost per unit of damage is not determined. Above that, the damage levels need to be monitored to enforce the fine system, which leads to high transactional costs.

Some form of public intervention and support is certainly needed in order to secure the provision of agri-environmental public goods at the required level. At the same time, it is also necessary to assess who is to pay for that, a society or a farmer, and when choosing a policy and designing the interaction schemes, at what cost what capital to use for that purpose?

Government capital can cost even more than private one, if one takes into account cost of debt and cost of equity, or funds from non-debt sources, such as the public treasury. There are also opportunity costs, if public funds are redirected from another public goal (e.g., education, defense or science), and the true cost of equity of public funds can be quite high, taking into account the economic return achievable in other areas (Green et al., 2015).

In this context, the example of the Common Agricultural EU Policy (CAP) may be a good example, that sets the cross-compliance requirements supported by EU agricultural income support payments and rewards farmers for delivering public

goods not normally paid for by markets, such as taking care of the countryside and the environment.

There is a stated minimum level of environmental quality the farmers are obliged to provide at their own expense, and environmental payments are used to achieve environmental targets.

The EU CAP has made agri-environment schemes (AES) the most important policy tool for providing environmental public goods within agricultural activities. They can be grounded on voluntary actions and participatory approaches or mandatory steps under top-down decisions. In any case, they imply coordination or cooperation between farmers and society, which is the only way out of the conflict between damager and victim liabilities.

Another dimension of setting up communication between private agents and society is an example of EU´s activity in rural areas. According to the research done on EU rural areas in numbers (European Commission, 2019), rural and intermediate areas account for 83 % of the EU's territory and absolute majority of its natural assets. At the same time, rural EU residents are more likely to trust local and regional authorities (57%) than their national government or the EU.

The bioeconomy in the EU has annual turnover of €2.2 trln EUR and employs around 17.5 mln people. The whole agri-food chain represents 75% of the employment in the EU's bioeconomy and represents two-thirds of its turnover. The number of tourism nights per inhabitant in rural EU regions is three times higher than in urban regions.

According to the EU Rural Action Plan (European Commission, 2022), as providers of services that protect ecosystems and solutions for carbon neutrality, rural areas have a key role to play in the sustainable bio- and circular economy. This Action Plan implies financial support for the purposes of green transition. There are many other Programs and Plans (The New EU Forest Strategy, Biodiversity Strategy, etc.) and funds, e.g., European Agricultural Fund for Rural Development that can allocate resources to farmers.

When the goals set and there is financial support, it is evident that the private agents can ensure rich habitats and cultural landscapes. However, it is a very complex issue, requiring assistance and planning at a bigger regional level. It is obvious that bigger territories and more diverse circle of participants can achieve more goals and get more financial support, searching for a **solution that maximizes the net benefit of the whole area**.

There is no standard model or solution for rural areas, since it should be local people taking stock of local assets and the initiative.

Schrijver, R. and Uetake, T. in their work for OECD (2015) analyzed agri-environmental policies in Netherlands, the second largest agricultural exporter in the world (FAO, 2022). The report stated the country´s point of view that "Legitimate government interference occurs only where there is a market failure that causes serious under provision of public goods". Public service is needed if it is a case of public interest with insufficient supply without collective action, and

a role of government is needed due to its public value, provided that the social value needs public guarantees.

In a society committed to welfare maximization in a market economy a market failure justifies some collective action, however only if the resulting benefits exceed the costs (Klemperer, 2003).

5. Examples of local collaboration in Netherlands and Sweden

The Netherlands may be called a country of cooperative farming. The Dutch government welcomes the collective action since it leverages resources among farmers and non-farmers and brings larger environmental benefits to society in general. This practice started in the 1990s' and has grown to over 160 such agri-environmental associations acting as communities of practice (Schrijver, R. & Uetake, T., 2015).

Since 2007, it is the Dutch provinces that are responsible for most landscape and biodiversity policies. The implementation of the CAP and national agricultural policies is partially delegated to the 12 provinces of the Netherlands. The provinces are actively involved in preparing a national strategic plan for the CAP.

After research and debates on AES effectiveness the Dutch government decided to introduce a **cross-farm approach** and to deal with cooperative applications, by means of which to better support farmland biodiversity. Combined territories are beneficial to farmland birds creating ecological corridors, and give greater flexibility for conservation activities, their exact location and their financial compensation.

Cooperatives are the beneficiaries of agri-environment support and function as producer cooperatives for public goods. The government signs a contract with a regional cooperative, setting the agri-environment and conservation targets for six years on a specified land area at a budget per habitat based on the average payments per ha for the different activities. Then the cooperative concludes contracts with individual land users under the terms and conditions needed at field level to achieve the habitat´s goals at a landscape level. It is also possible to do the regional fine-tuning of conservation activities and payments (Terwan P. et al., 2016).

The provincial government makes a detailed selection of target species, designates areas for the most effective conservation activities, allocates the budget and directly collaborates with cooperatives.

There are other stakeholders involved, e.g. conservation organisations, environmental NGOs or universities for ecological advice or monitoring, in synergy with the ecological guidance provided by the cooperative.

The Netherlands has chosen to require "groups of farmers",
as mentioned in the EU regulation, to organise themselves in legal entities, which are to be certified as professional conservation organisations.

A very important policy measure classified as facilitative is support to institutions (environmental cooperatives, research and innovation programs).

There are facilitative programs of the Ministry of Economic Affairs on biodiversity with subsidies to enterprises for their pilot projects. Communities of Practice subsidies projects on reduction of ammonia emissions from agriculture. The key requirements are a network of participants in these projects.

Public-Private Partnerships with the whole production chain are established to innovate and acquire stronger positions in the world, for the purpose of which much of the combined R&D budget is directed to it. The result is that 15 out of the top 20 biggest agrifood companies have major production or R&D sites in the Netherlands, such as Nestlé, AB InBev, Coca-Cola, Unilever, Heineken, Cargill and Kraft Heinz (Invest in Holland, 2021).

The example of **Sweden**, especially the Swedish mountain region currently experiencing a high development pressure, is interesting also in terms of a participatory approach. It is a challenge to protect sensitive environment that is of interest for different competitive land uses. Collaborative governance solutions are becoming increasingly common in such situations of market failures, including the pooling of resources among stakeholders for their sustainable management.

The Swedish mountain region combines wetlands, nature reserves, conventional forestry on all productive private lands, hydropower production on rivers, wind power, mining, tourism, recreation on all types of land, reindeer husbandry, Sami people traditional territories. Besides, in the local rural municipalities the financial resources and population decrease.

National policies in the forest, rural development, and water management sectors mention to engage a broader range of actors, including local communities, in the form of public–private partnerships (PPP). Regional authorities, the County Administrative Boards, deal with regional funding and the allocation of EU and national funding to environmental PPPs.

The EU Rural Development Program LEADER financially supports partnerships at a sub-regional level among the public, private, and civil sectors who contribute to rural development. As for many other EU funds, the organization of projects in the form of PPPs is required to access the funding, therefore many municipalities engage in PPPs. The involvement of municipalities is essential for providing leadership, administrative support, and accountability.

Thellbro C. et al. (2018) made research on PPPs in the Swedish mountain region and analysis of the factors that contributed to their successful and effective activity. Most of the projects concerned concrete actions or measures. One-third of the projects dealt with collaboration on the development and improvement of tracks and access to nature/the landscape. Some PPPs were formed to develop or to restore values or facilities/constructions for tourism, nature and culture, water, and fishing. In many of these projects, recreation was an important additional subject.

Most of the respondents mentioned, that forming a PPP offered the possibility to access funds for activities and measures that voluntary organizations could not otherwise afford and that municipalities would not prioritize within their own

budget. Among the tourism-related PPPs, most were driven by the fact that a lot of actors are or need to be involved.

The survey also showed that PPP projects in the sphere of environmental issues and natural resource management most often engaged a few enthusiastic actors, and leadership was shown to be an important driver of success. PPPs were mainly "win-win" collaborations, where the involved actors all had an opportunity to gain and little to lose. Action-oriented and practical projects were perceived by respondents to a high degree successful.

6. Community-based public-private partnership

Long F. & Arnold M. (1995) define environmental partnerships as "voluntary, jointly-defined activities and decision-making processes among corporate, non-profit, and agency organizations that aim to improve environmental quality or natural resource utilization".

The practice shows that such partnership should be a formalized, long-term, mutual commitment between partners so that each partners' goals can be achieved more efficiently than without this commitment.

In infrastructure sectors, PPPs have been found to generally reduce costs, improve quality control, and expedite delivery of services. In environmental governance PPPs are a new and expanding dimension (Andonova I., 2010).

Earlier the cases mostly considered the EU finding and private agents could get a support with the help of local governments. However, private sector in some models can be responsible for financing the project. Private companies and corporations may have their own standards of corporate responsibility and strive at compensating greenhouse gases, restoring sites after activities.

They can have a goal to protect biodiversity and combat climate change increasing own social engagement. Some companies are interested in investments into green innovations or otherwise contributing to the nature. By involving the private sector, it is possible to achieve the environmental targets and to leverage the funds needed for the projects. Banks and private fund managers, corporations, green bonds, airlines, energy infrastructure operators start engaging in carbon offsets market.

The foundation of environmental plans should be the goal of securing healthy and cultural life and functional agricultural activities.

For such mutual projects the key aspects are to define the zones large enough for environmental measures. According to von Limburg Stirum, the Koski Manor owner, an unbroken forest of ten hectares or more already has an impact on biodiversity at a regional level (Forest.fi, 2019).

Under the project planning stage it is important to analyze who the stakeholders are and accurately choose the "extent of the market", i.e., who gains benefits from the resource in question. Not accounting for the full extent of the market can lead for example to underestimates of willingness to pay and aggregate value. What requests can be expected from the stakeholders, what

environmental categories must be examined and how much impact can be expected. Cost-effectiveness analysis is to be used when considering options.

A key foundation of this approach is the mutual interests and establishment of a long-term operating environment between the local community, regional authority and the private sector partner, whereby partners can share risks and take advantage of what each partner does best in order to achieve desired goals and objectives.

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